

SPATE IRRIGATION IN BALOCHISTAN

Presented by:

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BALUCHISTAN

- **Balochistan is one of four provinces of Pakistan and the biggest in terms of area (i.e., 347,190 km²).**
- **Areas of Balochistan are classified as hyper-arid to semi-arid, receiving an average rainfall of <50 - 350 mm annually.**



LAND USE OF BALOCHISTAN

- **Geographical area of the province is 34.72 mha.**
- **Out of this, cultivated area is 1.93 mha, representing only 5.6% of the geographical area, which is the lowest as compared to other provinces.**
- **The irrigated area of the province is 1.28 mha, representing 66% of the cultivated area.**



LAND USE OF BALOCHISTAN

- **The canal irrigated area is around 0.59 mha, representing 46% of the total irrigated area.**
- **The area irrigated by groundwater (tubewells and wells) is around 0.54 mha, representing 43% of the total irrigated area.**
- **The area irrigated by surface (canal) and groundwater resources is almost the same.**



LAND USE OF BALOCHISTAN

- The *Sailaba* (*spate*) and *Khushkaba* cultivated area is around 0.65 mha.
- The culturable waste of 4.0 million ha is the potential area for further development of *Sailaba* and *Khushkaba* farming in the province.

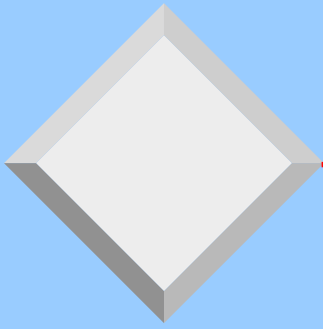
GROUNDWATER MANAGEMENT IN BALOCHISTAN



- **The upland of Balochistan is totally dependent on groundwater.**
- **The water table in Balochistan is lowering at a rapid rate of over 10 feet per year and groundwater is now being mined from deep aquifers.**

GROUNDWATER MANAGEMENT IN BALOCHISTAN

- **The World Bank experts in 2006 while developing the Groundwater Management Action Plan for the Pishin-Lora basin indicated that: *recharge to the aquifers of Quetta sub-basin would require centuries* and the only option available is to improve efficiency of groundwater use exclusively for domestic and urban uses (GWMAT 2006, World Bank Report).**



WAY FORWARD

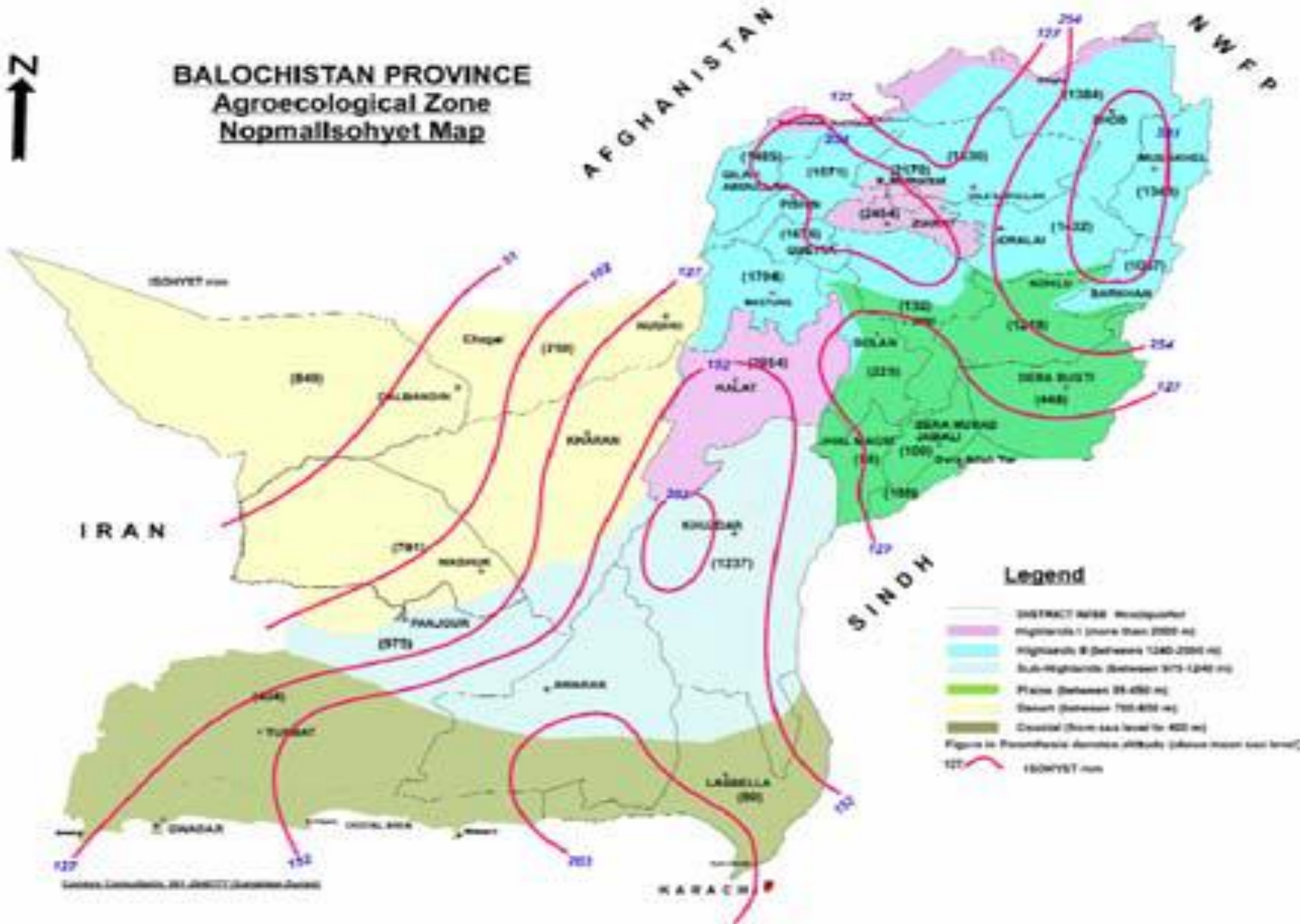


WAY FORWARD

- **To ensure sustainable development in Balochistan, the only available resource for future development is the floodwater, which has to be harnessed for development of Spate Irrigation and farming and to reduce the hazards infrastructure damages.**

AGRO-ECOLOGICAL ZONES

BALUCHISTAN PROVINCE
Agroecological Zone
Nopmallsohyet Map

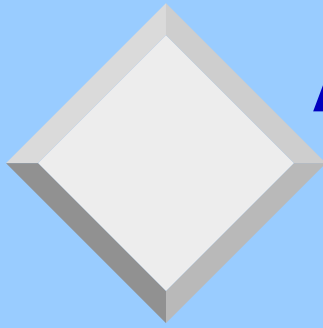


Source: Compendium of DISTRICT (various issues)



AGRO-ECOLOGICAL ZONES

- 1) Highlands - I:** comprise districts Ziarat and Kallat having an altitude of >2000 m above mean sea level.
- 2) Highlands-II:** comprise districts Quetta, Killa Abdullah, Musa Khel, Barkhan, Qilla Saifullah, Pishin, Loralai, Zhob and Mastung having an altitude of 1200–2000 m above mean sea level.



AGRO-ECOLOGICAL ZONES

- 3) **Sub-Highlands:** mainly include districts Khuzdar and Kohlu having an altitude of 900–1200 m above mean sea level.
- 4) **Deserts:** comprise districts Chagai, Dalbandin, Noshki, Panjgur, Awaran and Kharan having an altitude of 700–900 m above mean sea level.



AGRO-ECOLOGICAL ZONES

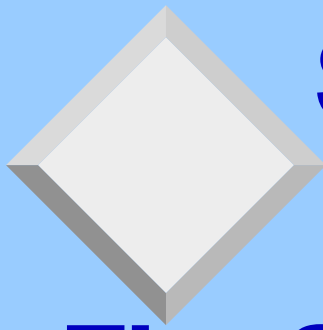
- 5) **Plains:** comprise districts Jhal Magsi, Naseerabad, Jafarabad, Bolan, Sibi and Dera Bugti having an altitude of 100–400 m above the mean sea level.
- 6) **Coastal Zone:** comprises districts Gwadar, Turbat and Lasbella having climate of mild to warm in winter and very hot in summer.

RAINWATER RUNOFF IN BALOCHISTAN





**Regulation and control
structure for non-perennial
Spate irrigation system (PARC)**



SPATE IRRIGATION

- **The *Sailaba and Khushkaba* farming systems are traditional systems and mainly of subsistence nature due to uncertainty associated with the system.**
- **Cropping intensity is usually low and around 70 and 30% under *Sailaba and Khushkaba* farming systems, respectively.**



LAND USE SYSTEMS AND AGRO-ECOLOGICAL ZONES

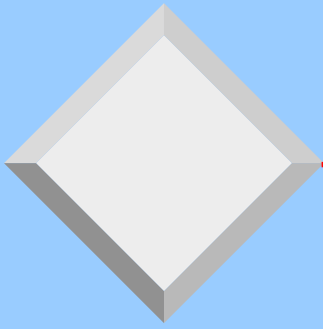
- **The *Sailaba* area characterization indicated that largest area of 36% lies in Plains followed by Highlands-II (20%), Sub-highlands (18%), Deserts (11%) and Coastal (10%).**
- **The perennial *Sailaba* systems are largely located in Highlands and Subhighlands.**
- **Total *Sailaba* area in all six agro-ecological zones of Balochistan is approximately 247,880 ha.**



CROPPING PATTERNS

Cropping patterns of *Sailaba* farming systems in various ecological zones are:

- **Highlands-I: Fallow-Wheat/Cumin/Barley**
- **Highlands-II: Beans/Sorghum-Wheat/Barley**
- **Sub-Highlands: Beans/Sorghum-Wheat/Barley**
- **Plains: Mashbeans-Wheat/Rapeseed**
- **Coastal zone: Sorghum-Wheat/Barley.**



PROBLEMS RESTRICTING CHANGES IN LAND USE IN BALOCHISTAN



PROBLEMS RESTRICTING CHANGES IN LAND USE

Problems and constraints restricting changes in land use patterns in *Sailaba and Khushkaba* farming systems are:

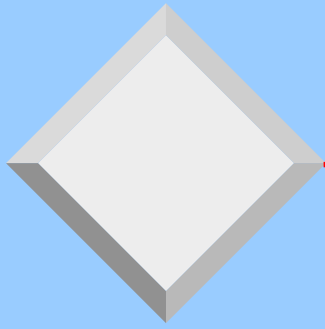
- in-sufficient and erratic rains;**
- lack of appropriate diversion structures;**
- un-improved water conveyance and application system;**
- lack of effective water users' associations for resolving conflicts related to water distribution;**



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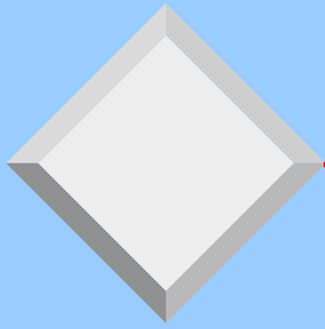
- lack of documentation of water entitlements and regulations for equitable distribution of water in *Sailaba* Systems;**
- lack of conjunctive management of incident rainfall and runoff;**
- lack of land leveling equipment, water use technologies and precision planting machines;**



PROBLEMS RESTRICTING CHANGES IN LAND USE

Problems and constraints restricting changes in land use patterns in *Sailaba and Khushkaba* farming systems are:

- **inadequate research and development support in water and agriculture sectors; and**
- **shortage of trained human resources.**



IMPORTANCE OF SPATE IRRIGATION FARMING IN BALOCHISTAN



IMPORTANCE OF SPATE IRRIGATION FARMING IN BALOCHISTAN

- **Importance of *Sailaba and Khushkaba* farming systems can be realized from the fact that these systems contribute at least one-third of the total cultivated area of the province, even in a dry year.**
- **The current culturable waste is around 4.0 million ha, which if developed for *Sailaba and Khushkaba* farming, can triple the current cultivated area of the province.**



IMPORTANCE OF SPATE IRRIGATION FARMING IN BALOCHISTAN

- **Thus, there is a huge potential for further development of *Spate* farming system, which has been neglected in the past.**
- **Currently, there is not any development program financed by the federal or the provincial government for the development and management of spate farming system in the province.**



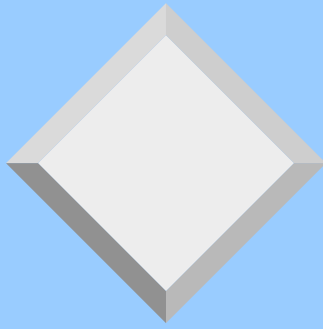
IMPORTANCE OF SPATE IRRIGATION FARMING IN BALOCHISTAN

- **The government is providing routine extension services coupled with provision of bulldozers and tractors for construction of bunds and rough leveling of land.**
- **Consequently, this system has faced deterioration as two-third of the floodwater of Sailaba (Spate) is still unutilized, which is almost equal to the size of the storage of Tarbela dam.**



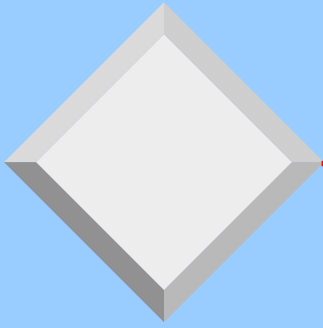
IMPORTANCE OF SPATE IRRIGATION FARMING IN BALOCHISTAN

- **The rains result in serious floods and damages to the infrastructure (roads, buildings, irrigation structures, etc.), loss of human life and livestock, damages to agricultural lands and crops.**
- **The IWRM Policy of Balochistan has already emphasized the development and management of Spate farming system by developing network of Spate irrigation through sustainable diversion and spreading of floodwater.**



IMPORTANCE OF SPATE IRRIGATION FARMING IN BALOCHISTAN

- **The situation of recent disaster in Balochistan reinforces the IWRM Policy for according high priority for Spate Irrigation and runoff farming for Sailaba and Khushkaba systems.**



Thank You